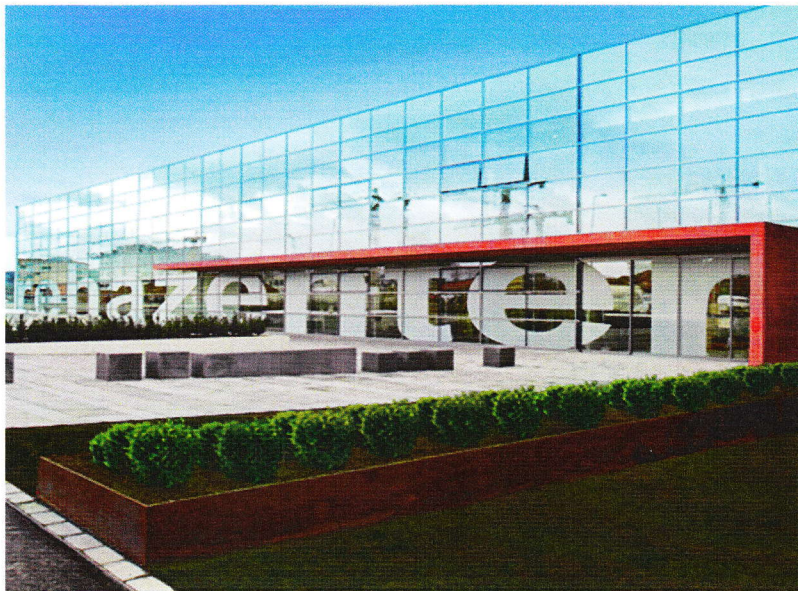


TEST OF THE DISINFECTION OF THE POOL SURROUND WITH BACOBAN WB™ (Water Basis)



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TEST OF THE DISINFECTION OF THE POOL SURROUND WITH BACOBAN WB™ (Water Basis) INTERIM REPORT

BACOBAN WB™ is a detergent/disinfectant developed by ADEXANO, which was manufactured in the first instance for the purposes of the tests described below. It was used to clean/disinfect the swimming pool surrounds and changing room floors at the REHAZENTER, 1, rue André Vésale - L-2674 Luxembourg – Kirchberg.



Photo 1: swimming pool at the Rehazenter



Photo 2: therapy pool at the Rehazenter

DISINFECTION EQUIPMENT AND TECHNIQUE

- The BACOBAN WB™ was diluted using an automatic electronic dilution machine, to a concentration of 1%.
- The BACOBAN WB™ was applied using an auto-scrubber.



Photo 3: automatic dilution machine



Photo 4: auto-scrubber

TEST CONDITIONS

This test was conducted in relatively tough conditions, i.e.:

- Relative humidity: 65% +/- 2%
- Ambient air temperature: 34 degrees Celsius +/- 1° C
- Swimming pool water temperature: 28 degrees Celsius +/- 0.5°
- Therapy pool water temperature: 32 degrees Celsius +/- 0.5°

DAILY PROCEDURE¹

The pool surrounds were disinfected using an auto-scrubber and a 1% solution of BACOBAN WB™.

The disinfection procedure was performed every day at 6 am, excluding Saturday and Sunday. It should be noted that, every Saturday, the pool surrounds were cleaned with a standard cleaning agent (an acidic detergent one week, and an alkaline detergent the next). This was done instead of the disinfection process, with a view to preventing lime scale deposits. No cleaning operations were performed on a Sunday.

TEST PERIOD

The test took place from 19th February 2007 to 14th June 2007, with no departures from the daily routine procedure.

Note that the establishment's cleaning staff were not informed of the dates on which the microbiological samples would be taken.

SAMPLING AND ANALYSIS METHOD

The samples were analysed by the “Laboratoire Pax de F” – Metz.

- AFNOR standard pr EN 1632-3 – Clean Room Technology – Biocontamination Control. Methods of analysing and measuring biocontamination of surfaces in zones at risk.

All the samples were taken by the same person.

The plates used were of the **Count-Tact** type (**Bio Mérieux**), which provide a culture medium in the shape of a convex meniscus and a contact surface of at least 20 cm².

Applicators were used to standardize surface collections (pressure of 25g/cm² for 10 seconds).

The advantage of this technique is that it is reproducible.

The sampling technique is described in the annexes to this document.

¹ This procedure has been validated, and is still in use at the time of writing this report.

OBSTACLES ENCOUNTERED

- No micro-laboratory within the establishment
- Very little literature on the contamination of pool surrounds in a hospital environment
- No standard method for testing the remanence of surface disinfectants

TESTS AND RESULTS

1st samples: Monday 14th MAY 2007

The samples were collected from 2 different places, namely the therapy pool surround and the swimming pool surround.

Sampling was performed every 2 hours from 6 am to 6 pm (i.e. 14 samples).

The first sample, at 6 am, was collected prior to disinfection.

As the sampling procedure began on a Monday, it is important to note that the surface was last disinfected on Friday 11th May at 6 am, i.e. 72 hours previously.

The first sample collection at 6 am revealed the presence of *sewage fungus* and *staphylococcus aureus*.

Disinfection by auto-scrubber at 6.15 am.

Sampling then took place from 8 am to 6 pm, in the presence of human activity.

- 8 am: Sterile in both locations
10 am: Sterile in both locations
12 pm: Sterile on swimming pool surround, 0.08 CFU/cm² (*non-pathogenic staphylococcus**, *sewage fungus**) on therapy pool surround
2 pm : Same as 12 pm
4 pm: Sterile on swimming pool surround, 0.12 CFU/cm² (*non-pathogenic staphylococcus**) on therapy pool surround
6 pm: Sterile on swimming pool surround, 0.08 CFU/cm² (*non-pathogenic staphylococcus**) on therapy pool surround

* identification only if the presence of a pathogenic germ is suspected

2nd samples: Wednesday 23rd MAY 2007

As the first results were considered satisfactory, it was decided to add a third sampling site.

This site was called the diving board surround and was located in front of the diving boards, where the therapists constantly walk back and forth.

This increased the number of samples to 21.

- 6 am: Sterile on swimming pool and diving board surrounds, 0.28 CFU/cm² on therapy pool surround
8 am: Sterile in the 3 locations
10 am: Sterile on swimming pool and diving board surrounds, 0.04 CFU/cm² on therapy pool surround

- 12 pm: Sterile on diving board surround, 0.04 CFU/cm² on therapy pool surround, 0.08 CFU/cm² on swimming pool surround
- 2 pm: Sterile on swimming pool and diving board surrounds, 0.08 CFU/cm² on therapy pool surround
- 4 pm: Sterile on swimming pool and diving board surrounds, 0.08 CFU/cm² on therapy pool surround
- 6 pm: Sterile on swimming pool surround, 0.04 CFU/cm² on diving board surround, 0.04 CFU/cm² on therapy pool surround

3rd samples: Thursday 31st MAY 2007

Still three locations. Total number of samples: 21

- 6 am: 0.16 CFU/cm² on diving board surround, 0.08 CFU/cm² on swimming pool surround, 0.08 CFU/cm² on therapy pool surround
- 8 am: Sterile on swimming pool and diving board surrounds, 0.04 CFU/cm² on therapy pool surround
- 10 am: Sterile on swimming pool and diving board surrounds, 0.08 CFU/cm² on therapy pool surround
- 12 pm: Sterile in the 3 locations
- 2 pm: Sterile on swimming pool and therapy pool surrounds, 0.04 CFU/cm² on diving board surround
- 4 pm: Sterile in the 3 locations
- 6 pm: Sterile on swimming pool surround, 0.04 CFU/cm² on diving board surround, 0.04 CFU/cm² on the therapy pool surround

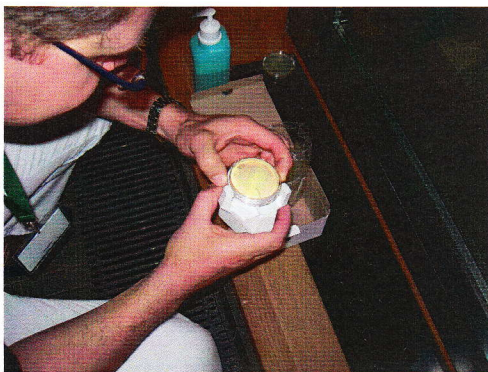


Photo 5: preparing the Count Tacts



Photo 6: Applying the Count Tacts

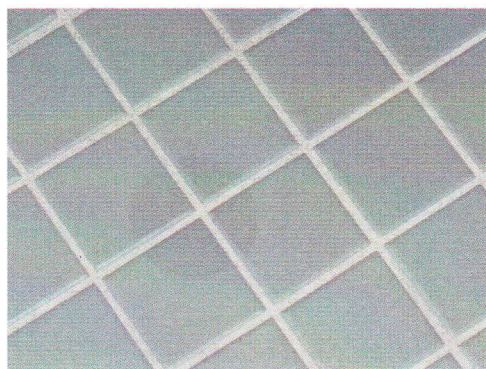


Photo 7: Sampling site

CONCLUSIONS ON THE 3 DAYS OF SAMPLING (56 samples in all):

The results obtained tend to confirm the remanence of the product used. In any case, they show that the bacterial colonies identified do not proliferate on the floor surfaces after cleaning and disinfecting.

In most cases (95%), the results obtained comply with requirements for level 4 (very high risk) areas, as defined in AFNOR standard EN 1632-3 relative to the biocontamination of active surfaces: aseptic operating theatres; burns, immunodeficiency, transplantation, chemotherapy, oncology departments, etc.

In 100% of cases, the results comply with requirements for level 3 (severe risk) areas, i.e.: paediatrics, intensive care, haemodialysis, sterilisation, etc.

In view of these results, it was decided to continue sampling further to voluntary contamination.

VOLUNTARY CONTAMINATION:

A series of tests was conducted on Thursday 14th June 2007, further to voluntary contamination. Due to inadequate resources, we were not able to quantify the level of contamination. Therefore, we simply isolated 2 areas and swabbed them generously with staphylococcus aureus (Staph) and Pseudomonas (Pyo).

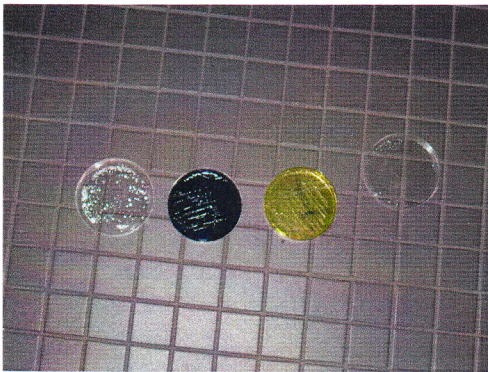


Photo 8: colonies provided by the lab

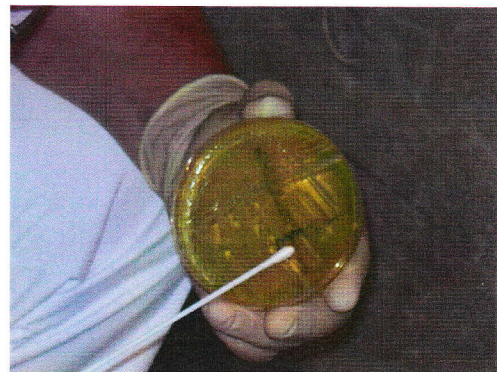


Photo 9: swabbing

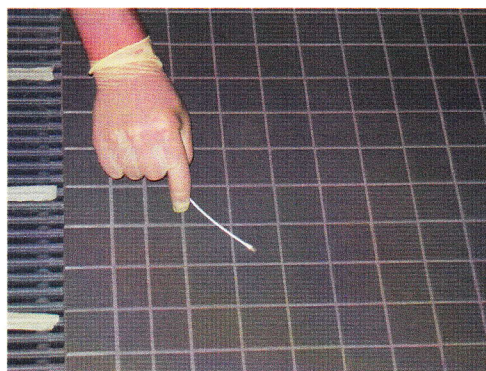


Photo 10: contamination of the surface

SAMPLES:

The same sampling technique was used. The 2 areas are defined as follows:

AREA 1:

This area was contaminated with Staph and Pyo. It was cleaned/disinfected **AFTER** contamination.



Photo 11: area 1 before contamination



Photo 12: area 1 after contamination



Photo 13: area 1 at 8 am

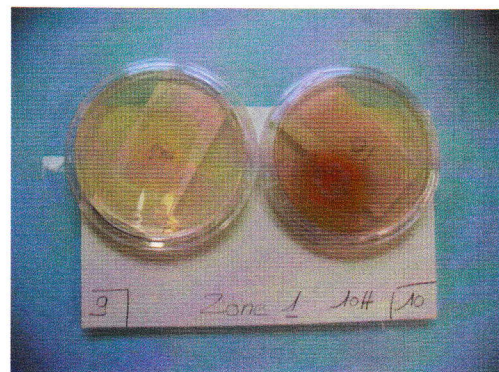


Photo 14: area 1 at 10 am



Photo 15: area 1 at 12 pm

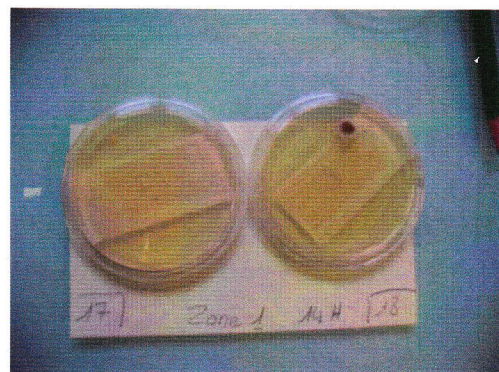


Photo 16: area 1 at 2 pm

AREA 2:

This area was contaminated with Staph and Pyo. It was cleaned/disinfected **BEFORE** contamination, enabling us to evaluate the remanence properties of the BACOBAN WB™.



Photo 17: area 2 at 8 am

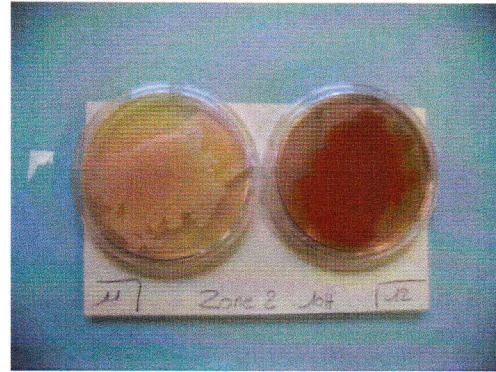


Photo 18: area 2 at 10 am



Photo 19: area 2 at 12 pm

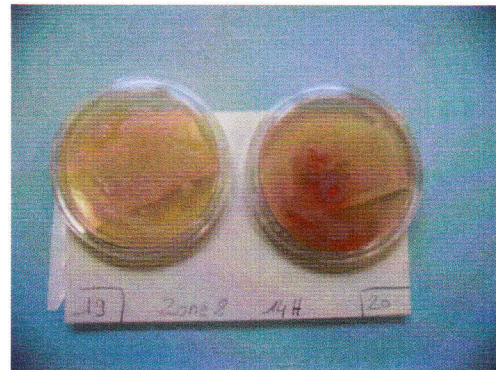


Photo 20: area 2 at 2 pm

- 6 am*: Sterile in both areas
- 6.05 am**: >12 CFU/cm² in area 1 after contamination
- 6.15 am: Disinfection according to the daily procedure
- 7 am: Contamination of area 2
- 8 am: AREA 1 Staph >12 CFU/cm², Pyo sterile. AREA 2 Staph and Pyo >12 CFU/cm².
- 10 am: AREA 1 Staph sterile, Pyo 0.04 CFU/cm². AREA 2 Staph and Pyo >12 CFU/cm².
- 12 pm: AREA 1 Staph and Pyo sterile. AREA 2 Staph and Pyo >12 CFU/cm².
- 2 pm: AREA 1 Staph 0.08 CFU/cm², Pyo sterile. AREA 2 Staph 0.12 CFU/cm², Pyo >12 CFU/cm²

* test prior to procedures

**contamination verification test

	6 am	6.05 am	6.15 am	7 am	8 am	10 am	12 pm	2 pm
AREA 1	test	contamination	DESINFECTION		test	test	test	test
AREA 2	test		DESINFECTION	contamination	test	test	test	test

This table summarises the sampling schedule.

CONCLUSIONS ON THE VOLUNTARY CONTAMINATION

The results obtained, bearing in mind the technical limits of the tests performed, visibly INDICATE (photos A to J) the presence of biocidal activity several hours after the application of the BACOBAN WB™. The results for AREA 1 reveal a significant reduction after disinfection, resulting in a sterile surface by 12 pm. AREA 2 results show that where contamination occurs after disinfection, the BACOBAN WB™ continues to have a significant effect. Due to time constraints, the sampling process was not continued after 2 pm. Nevertheless, in view of the above photos*, we are optimistic as to the decontamination of the floor in the following hours.

FURTHER BENEFICIAL EFFECTS

- The remanence of the product reduces the required frequency of disinfection in the area tested. (As far as swimming pools are concerned, the Department of Health recommends that disinfection be carried out every two hours).
- This cuts costs and improves safety.
- The aesthetic impact on the pool surround (anthracite tiles). Indeed, the product gives the tiles an even, satin finish.
- The product has a pleasant smell, appreciated by therapists and patients alike.
- The easy-to-clean aspect considerably reduces the build-up of lime scale on the tiles.
- This means that acidic or alkaline products need only be used once a week, thus reducing costs.

GENERAL CONCLUSION

In view of the identification of a number of ecological niches, which could potentially cause nosocomial infections, it is vital to control the environment and hence protect patients (especially the most vulnerable ones) and staff. The required level of control is based on the results of risk analysis procedures and the definition of specific quality targets for each broad type of situation.

* Note du traducteur : la phrase en français est "à la vue des photos ci-dessous". Comme il n'y a pas de photos en-dessous, je pense que c'est une faute de frappe. On devrait lire "à la vue des photos ci-dessus"?

The implementation of hygiene measures and of a strict preventive maintenance programme by qualified, motivated staff should enable these quality targets to be reached and maintained. These environmental control procedures should be monitored, first and foremost through the implementation of inspections. In certain situations, inspection procedures may include results indicators, such as microbiological samples.

In our case, the inspection was performed in a very specific medical environment. Therapy pools require very strict hygiene measures and our cooperation with Adexano has produced the results we hoped for. The use of BACOBAN WB™ in other areas of our establishment is currently being discussed. The possibility of conducting a case-control study in other more conventional treatment areas (such as the patient's bedroom) is being assessed.

We believe that controlling the contamination of the patient environment is a point in our favour, and that it very probably reduces the risk of cross-contamination in our establishment. However, it must not lead to a false sense of security. The best way of protecting our patients and staff from nosocomial infections is to enforce hand-washing recommendations.

ACKNOWLEDGEMENTS

The Rehacenter wishes to thank Adexano and Vital.Med (represented by Mr. Michel Legrand), for allowing it to test BACOBAN WB™ before its public release, in response to a specific infection prevention problem.

